

## Corporate Bond Spread Considerations When Analyzing Liability-Matching Portfolios



**Pierre Couture**  
A.S.A., E.A.,  
M.A.A.A.

Senior Actuary,  
Multi-Asset  
Strategies and  
Solutions Group

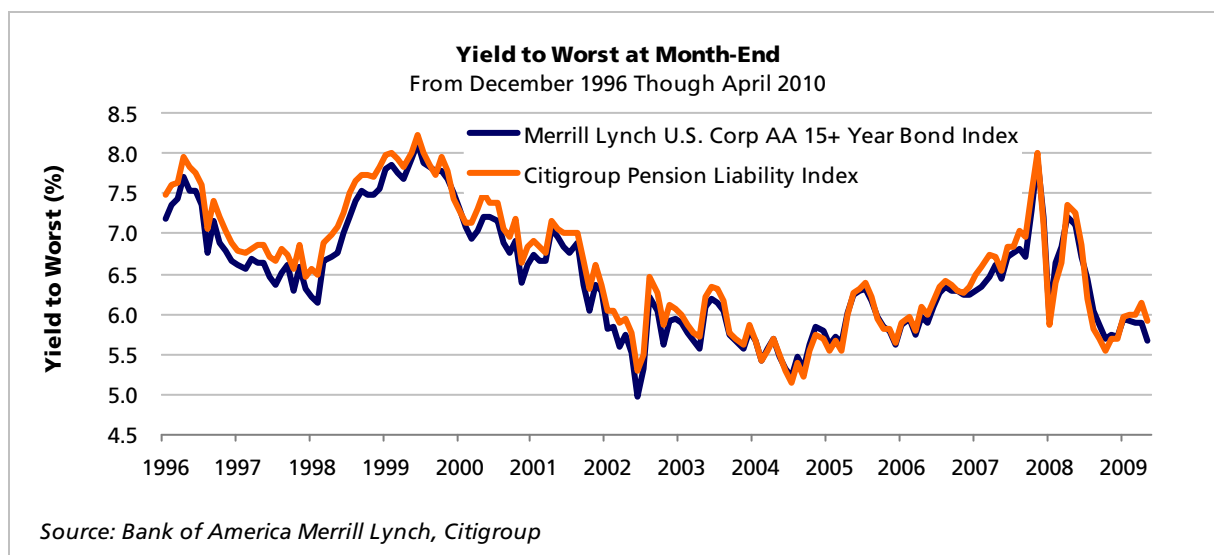
The primary objective of a liability-driven investment (LDI) strategy is to manage a pension liability's sensitivity to changes in both Treasury yields and high-quality corporate bond spreads by allocating assets across fixed income strategies engineered to provide the desired degree of liability matching. Matching the liability's sensitivity to changes in interest rates is the easier part of the process and can be done with Treasury coupon bonds, Treasury STRIPS, corporate bonds or derivatives of various maturities. Closely matching the liability's sensitivity to changes in corporate bond spreads, on the other hand, is more of a challenge, as future benefit cash flows are discounted based on high-quality corporate bond yield indexes that are effectively un-investable.

In this article, I analyze the ability of a couple of long corporate bond indexes to closely match a pension liability's sensitivity to changes in corporate bond spreads. More specifically, I identify the circumstances in which an LDI portfolio managed to a long government/credit index would be acceptable and when a long corporate index would be a more appropriate benchmark.

As a first step, I looked at the historical excess returns over a sequence of 12-month periods beginning December 1996 for a corporate bond index that closely approximates the accounting liability discount rate. By examining returns in excess of Treasuries, we are able to approximate the liability growth rate due to changes in corporate bond spreads only. The Citigroup Pension Liability Index is widely used by corporate plan sponsors to calculate the present value of future liability cash flows for accounting purposes, but excess returns statistics on that index are not readily available. However, as shown in Figure 1, we found that the Merrill Lynch U.S. Corporate Aa 15+ Year Bond Index is very highly correlated with the Citigroup Pension Liability Index over the December 1996 to April 2010 period; comparing the yields to worst of the indexes showed a correlation of 0.986.

I then analyzed the distribution of option-adjusted spreads (OAS) for the Merrill Lynch index over that same time period. As shown in Figure 2 (next page), the average OAS was 125 basis points (bps), with a

**Figure 1: Comparing yields to worst shows high correlation**

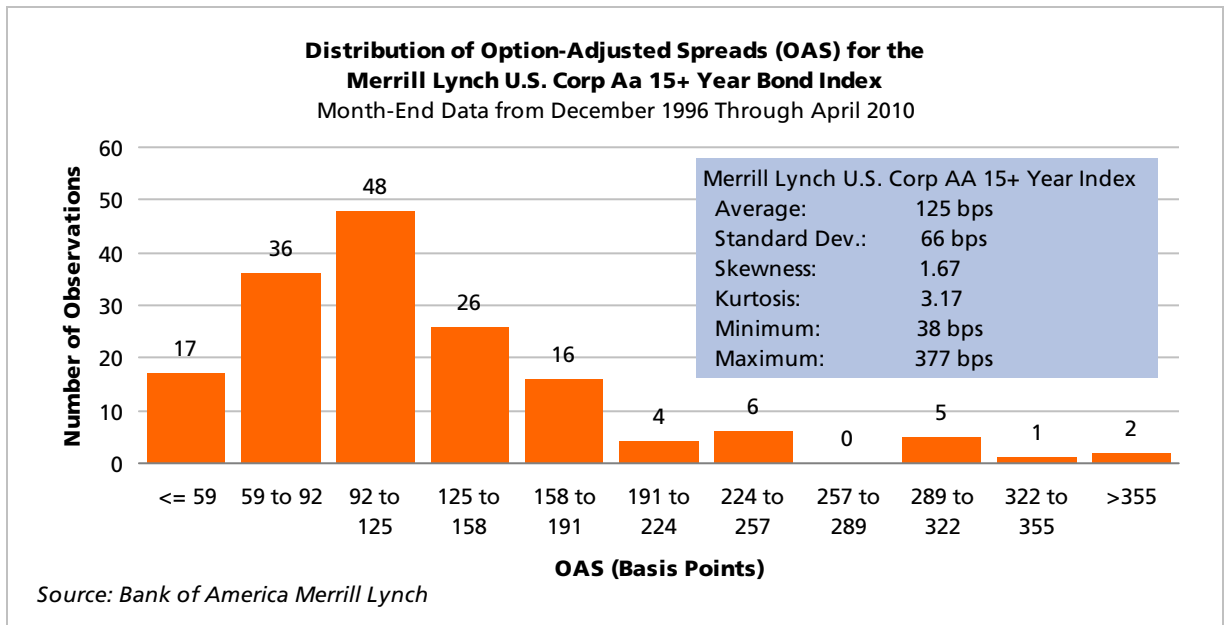


standard deviation of 66 bps; however, the outcomes were far from being normally distributed. The excess kurtosis — a measure of the peak level of the probability distribution — was high relative to a normal distribution (3.17 as opposed to 0). Higher excess kurtosis means that more of a distribution's variance is derived from infrequent extreme deviations, as opposed to more frequent but modestly sized deviations.

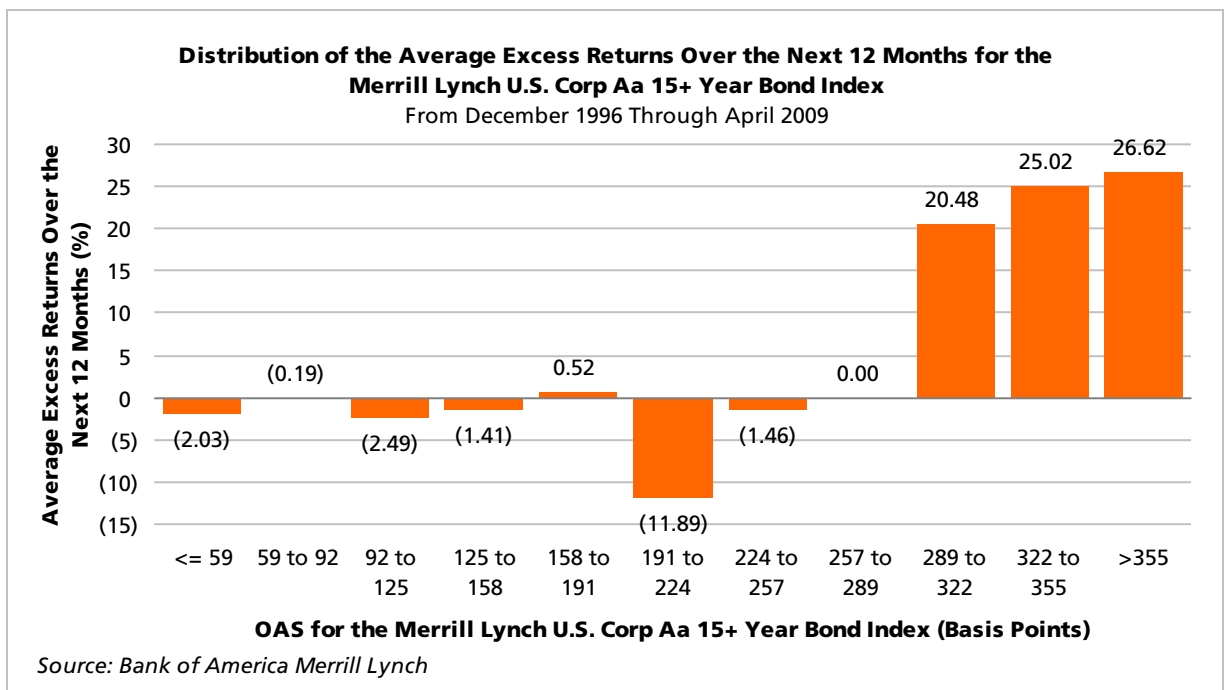
Note that as of May 10, 2010, the OAS for the Merrill Lynch index was 152 bps (it had been as low as 126 bps on April 21, 2010). Out of 161 monthly observations since December 1996, 124 of them have been at or below 152 bps.

Using the Merrill Lynch U.S. Corporate Aa 15+ Year Bond Index, I then graphed the next-12-month excess returns for each monthly data point during the

**Figure 2: OAS distribution indicates high excess kurtosis**



**Figure 3: Wide OAS have tended to fall rapidly**



December 1996 to April 2009 time period, as shown in Figure 3. Assuming a pension plan with a similar spread duration as the index (i.e., about 10 years), these numbers can be considered proxies for the portion of the plan’s liability growth rate that is due to the changes in spreads only.

The average of the next-12-month excess returns was then calculated for each of the OAS buckets shown in Figure 2. For example, the OAS on the Merrill Lynch U.S. Corporate Aa 15+ Year Bond Index as of April 30, 2009, was 319 bps; the excess returns over the next 12 months (from May 1, 2009, through April 30, 2010) was 24.58%, as the OAS contracted to 131 bps by the end of the period. The excess returns over the next 12 months for the other data points in the 289–322 bps OAS bucket averaged 20.48%.

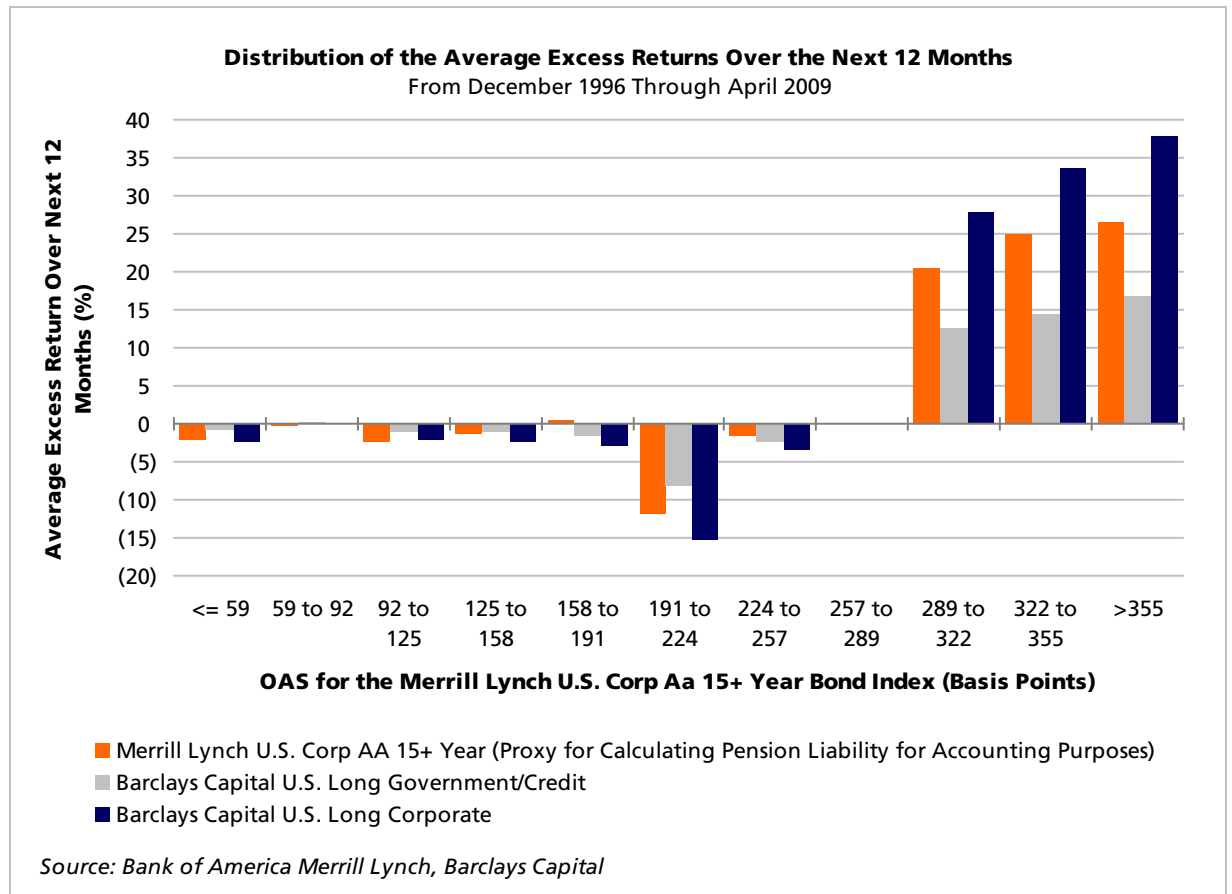
Figure 3 shows that the average excess return of the index over the next 12 months for the 125–158 bp OAS bucket was -1.41%. Interestingly, it appears that when OAS are 191–224 bps, they mostly moved up over the next 12 months — the average excess returns over the next 12 months for that bucket was

-11.89%. Meanwhile, when OAS reached extreme levels (that is, greater than 289 bps), they appeared to have fallen rapidly over the next 12 months — the average excess return over the next 12 months for the three buckets on the right side of the graph was greater than 20%.

Finally, we compared the average excess returns over the next 12 months of the liability-proxy to a couple of long-maturity bond indexes (Barclays Capital Long Gov/Credit Bond Index and Barclays Capital Long Corporate Bond Index) often used by plan sponsors that have extended the duration of their fixed income portfolio.

As shown in Figure 4, when OAS reached extreme levels (greater than 289 bps), investing in bonds benchmarked to the Barclays Capital Long Corporate Bond Index provided a higher excess return over the next 12 months than both the Barclays Capital Long Government/Credit Index and the liability-proxy. On the other hand, when OAS were relatively low or close to long-term averages, investing in bonds benchmarked to the Barclays Capital Long Gov/Credit Index was not a bad choice. ■

**Figure 4: Different indexes for different market conditions**



Copyright © 2010 ING Investment Management. This material may not be reproduced in whole or in part in any form whatsoever without the prior written permission of ING Investment Management. To obtain permission, contact [david.chung@inginvestment.com](mailto:david.chung@inginvestment.com) or 212-309-8440. For all other inquiries contact David White, Publishing Manager, [david.white@inginvestment.com](mailto:david.white@inginvestment.com) or 860-275-2056.

This report does not make any recommendation about your investments, and this information should not be considered investment advice. Any opinions expressed herein reflect our judgment at this date and are subject to change. Certain of the statements contained herein are statements of future expectations and other forward-looking statements that are based on management's current views and assumptions and involve known and unknown risks and uncertainties that could cause actual results, performance or events to differ materially from those expressed or implied in such statements. Actual results, performance or events may differ materially from those in such statements due to, without limitation, (1) general economic conditions, (2) performance of financial markets, (3) interest rate levels and (4) increasing levels of loan defaults (5) general competitive factors (6) changes in laws and regulations (7) changes in the policies of governments and/or regulatory authorities. ING Investment Management assumes no obligation to update any forward-looking information contained in this document. Past performance is not indicative of future results.